

1 molecule significantly impacts the quality of the dewaxed oil product. For
2 example, isomerizing a normal C₂₄ paraffin, tetracosane, using a large pore
3 zeolite catalyst conventionally taught for wax isomerization, generally
4 produces a significant quantity of triply branched paraffin isomers. Even
5 medium pore catalysts taught for wax isomerization, when isomerizing a waxy
6 feed to a low pour point, produces significant quantities of the triply branched
7 isomers. While not wishing to be bound by theory, it is believed that normal
8 paraffins are first converted during wax isomerization to a singly branched
9 paraffin having a methyl (–CH₃) or ethyl (–C₂H₅), branch near the end of the
10 paraffin backbone. Additional isomerization reactions move the branch
11 toward the center of the paraffin molecule and/or add a second branch to the
12 paraffin molecule. Each of these two isomerization reaction steps reduces
13 pour point.

14 However, conventional single stage and/or large pore zeolite dewaxing
15 processes are unselective for forming branches. These unselective catalysts
16 produce triply (or even more highly) branched isomers along with the singly
17 and doubly branched isomers before reaching the target pour point. These
18 highly branched molecules have an increased tendency to crack and have a
19 lower viscosity index than do singly or doubly branched paraffins.
20 Furthermore, the addition of a third branch to a doubly branched paraffin
21 often results in relatively little additional pour point reduction. Thus, these
22 conventional processes are prevented from producing lubes with the desired
23 viscosity index and pour point properties.

24 In the present process, normal paraffins are isomerized at high
25 selectivity to singly and doubly branched paraffins using a process which
26 produces few triply branched paraffins. The shape selective catalyst of the
27 present invention, comprising a 1-D intermediate pore size molecular sieve,
28 restricts the amount of triply branched paraffins which are formed in the
29 isomerization of a waxy feed, while producing a product having an
30 intermediate pour point. The remaining wax is removed in a solvent dewaxing
31 step to produce a lubricating oil base stock with a very low pour point and a

- 1 18. The process according to claim 17 wherein the catalyst contains from
2 about 0.2% to about 1% by weight of the hydrogenation component.
- 3 19. The process of claim 1 wherein the catalyst comprising the molecular
4 sieve has sufficient isomerization selectivity such that, when contacting a
5 n-C₂₄ feed at a total pressure of 1000 psig (6.99 MPa), hydrogen flow
6 equivalent to 6.7 MSCF/bbl (1010 std liters H₂/kg oil), and a feed rate
7 equivalent to 0.6 hr⁻¹ LHSV with the catalyst, to produce a 316°C+
8 dewaxed product having a pour point of about +20°C and solvent
9 dewaxing the dewaxed product to a pour point of -15°C or below, an
10 isomerized product having a branching index of less than about 1.75 is
11 formed.
- 12 20. A process for preparing an oil suitable for use as a lubricating oil base ✓
13 stock comprising:
- 14 a) contacting a waxy feed over a catalyst comprising a molecular sieve
15 having 1-D pores with a pore diameter of between about 5.0 Å and
16 about 7.0 Å, and at least one Group VIII metal, at a pressure of from
17 about 15 psig (103 kPa) to about 2500 psig (13.8 MPa) to produce an
18 isomerized oil having a pour point of greater than about 0°C; and
- 19 b) solvent dewaxing the isomerized oil to produce a lubricating oil base
20 stock having a pour point of less than or equal to -10°C, a viscosity
21 index of greater than about 140 and a viscosity, measured at 100°C, of
22 about 3 cSt or less.
- 23 21. The process according to Claim 20 wherein the viscosity of the lubricating
24 oil base stock, measured at 100°C, is less than about 3 cSt and the pour
25 point is less than or equal to -20°C.
- 26 22. The process according to Claim 20 wherein the viscosity index of the
27 lubricating oil base stock is greater than 150 and the pour point is less
28 than -20°C.
- 29 23. The process according to Claim 20 wherein the molecular sieve is
30 SSZ-32.